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| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| EXAMINER | | | | |
| REDDY, KARUNA P | | | | |
| ART UNIT | | PAPER NUMBER | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/539,132

Applicant(s)

SCHULTES ET AL.

Examiner

KARUNA P. REDDY

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/ISD)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 3/12/2008

DETAILED ACTION

1. This office action is in response to the amendment filed on 2/26/2008. Claims 1-17 are cancelled; and claims 18-38 are added. Claims 18-38 are currently pending in the application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 18-31 and 34-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Takarabe et al (US 4, 914, 142) and DeWitt (US 4, 173, 596).

Hofmann discloses a multistage, sequential process for making an acrylic graft copolymer. Upon blending with a non-resilient methacrylic matrix resin, followed by molding an impact resistant molded product is obtained (abstract). See example 9 for the process of making a three-stage resin. The proportions of monomers in stage 1, 2 and 3 read on the proportions of monomers of claim 18. Preferred polymerization temperatures range from 60⁰ to 90⁰C (column 3, lines 16-17). See example 1, wherein 1000 g of water is emulsified with 0.52 grams of a 72% solution of sodium dioctyl sulfosuccinate (column 5, lines 48-53) and

reads on weight percentages of water and anionic emulsifier of claims 19-20. $K_2S_2O_8$ i.e. potassium peroxodisulphate in demineralized water was added to initiate reaction (column 5, lines 56-58). See example 1, wherein the stage 2 and 3 monomers are metered in over a period of several minutes (column 5, lines 58-67). The acrylic graft copolymer was compounded with a methyl methacrylate (MMA) / ethyl acrylate (EA) copolymer. The MMA/EA copolymer was compounded with 62.5 percent of the graft copolymer. The blended resin was compression molded. The particle size of acrylic graft polymer was 0.155 microns (column 6, lines 28-42). It is the examiner's position that final product obtained by the process of Owens in presence of seed latex particle and alkyl alcohol of Takarabe et al is a core-shell particle since the polymerization is conducted in multiple stages.

Hoffman differs with respect to total weight of components A-J, based on the total weight of aqueous dispersion; and the initial charge is an aqueous emulsion of a long chain alkyl alcohol or seed latex whose particle radius is 3.0 to 20 nm.

However, Takarabe et al teach a method by which a highly monodisperse emulsion polymer having a large particle diameter can be produced while the occurrence of a coagulum or new particles during the polymerization is inhibited to a low level (column 2, lines 30-36). The object is achieved by adding a polymerizable monomer to an emulsion polymer containing a high-molecular weight compound as a seed polymer and thereafter, polymerizing the monomer

in presence of a film forming aid (column 2, lines 37-46). Typical examples of the film-forming aid include ethylene glycol, isopropyl benzyl alcohol (column 3, lines 24-46). Furthermore, DeWitt teaches improved impact modifiers prepared by emulsion polymerization in the presence of seed latex. (column 2, lines 66-68). Latex is initially provided wherein polymer particles are dispersed in an aqueous medium. These polymer particles have an average size range of from about 200 to about 2,000 Å units (column 3, lines 59-62). Therefore, it would have been obvious to add seed polymer with a particle size of 20 nm to 200 nm, and film forming aid such as alcohol to the initial charge of Hofmann, and obtain a highly monodisperse emulsion core-shell polymer with a desired particle size and impact strength, while maintaining coagulum or new particle formation at a low level.

With respect to total weight of components A-J, the proportion of monomers in examples of Hoffman read on the proportion of components A-J of instant invention. The amount of solvent i.e. water used to form emulsion or dispersion is within the scope of a skilled artisan and can be varied depending on the desired solids content and end use requirements, absent evidence of unexpected results.

As to the properties of claim 35-37, in light of the fact that prior art teaches / discloses essentially the same molding composition made by a similar process as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that the molding composition of prior art would exhibit essentially

the same property(ies) under similar test conditions. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

4. Claims 18-26, 29-31 and 34-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Owens (US 3, 793, 402) in view of Takarbe et al (US 4, 914, 142) and DeWitt (US 4, 173, 596).

Owens discloses a low haze impact resistant composition containing a multi-stage, sequentially produced polymer (title). Preferably, the multi-stage polymer is a three stage composition wherein the stages are present in ranges of 10 to 40 percent by weight of the first stage (A), 20 to 60 percent of the second intermediate stage (B), and 10 to 70 percent of the final stage (C), all percentages based on the total weight of the final stage (column 2, lines 51-56). The level of emulsifier is preferably below one percent (column 4, lines 33-34). The multi-stage emulsion polymerization can be carried out at temperatures ranging preferably from 30°C to 95°C (column 4, lines 62-64). See example 1 for the proportions of monomers used to form multi-stage polymer (column 12, line 48). The monomer charge is polymerized using potassium persulfate (column 12, lines 52-53). The monomer charge is emulsified in water with sodium dioctyl sulfosuccinate as the emulsifier (column 12, lines 51-52) and reads on the anionic emulsifier of claim 4. The hard-core thermoplastic material is blended

with 50% of poly(methyl methacrylate) molding powder. The test pieces are then injection molded (column 12, line 75). It is the examiner's position that final product obtained by the process of Owens in presence of seed latex particle and alkyl alcohol of Takarabe et al is a core-shell particle since the polymerization is conducted in multiple stages.

Owens is silent with respect to total weight of components A-J, based on the total weight of aqueous dispersion; and the initial charge is an aqueous emulsion of a long chain alkyl alcohol or seed latex whose particle radius is 3.0 to 20 nm.

However, Takarabe et al teach a method by which a highly monodisperse emulsion polymer having a large particle diameter can be produced while the occurrence of a coagulum or new particles during the polymerization is inhibited to a low level (column 2, lines 30-36). The object is achieved by adding a polymerizable monomer to an emulsion polymer containing a high-molecular weight compound as a seed polymer and thereafter, polymerizing the monomer in presence of a film forming aid (column 2, lines 37-46). Typical examples of the film-forming aid include ethylene glycol, isopropyl benzyl alcohol (column 3, lines 24-46). Furthermore, DeWitt teaches improved impact modifiers prepared by emulsion polymerization in the presence of seed latex. (column 2, lines 66-68). Latex is initially provided wherein polymer particles are dispersed in an aqueous medium. These polymer particles have an average size range of from about 200 to about 2,000 Å units (column 3, lines 59-62). Therefore, it would have been

obvious to add seed polymer with a particle size of 20 nm to 200 nm, and film forming aid such as alcohol to the initial charge of Owens and obtain a highly monodisperse emulsion core-shell polymer with a desired particle size and impact strength while maintaining coagulum or new particle formation at a low level.

However, the proportion of monomers in examples of prior art read on the proportion of components A-J of instant invention while the amount of water used is open ended. The amount of solvent i.e. water used to form the emulsion or dispersion is within the scope of a skilled artisan and can be varied depending on the desired solids content and end use requirements, absent evidence of unexpected results.

As to the properties of claim 35-37, in light of the fact that prior art teaches / discloses essentially the same molding composition made by a similar process as that of the claimed, one of ordinary skill in the art would have a reasonable basis to believe that the molding composition of prior art would exhibit essentially the same property(ies) under similar test conditions. Since PTO cannot conduct experiments, the burden of proof is shifted to the applicants to establish an unobviousness difference. See *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977).

5. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Takarabe et al (US 4, 914, 142) and DeWitt

(US 4, 173, 596) as applied to claim 29 above, and further in view of Falk et al (US 4, 542, 179).

The discussion with respect to Hofmann in view of Takarabe et al and DeWitt in paragraph 3 above is incorporated here by reference.

Hofmann in view of Takarabe et al and DeWitt is silent with respect to the use of styrene-acrylonitrile in the molding composition.

However, Falk et al teach that addition of styrene-acrylonitrile copolymer to acrylic core-shell polymers reduces mold shrinkage and improves surface hardness. The styrene-acrylonitrile copolymer resins useful in the practice of this invention are copolymers of styrene and acrylonitrile comprising from 50 to 90% by weight of styrene and 10 to 50% by weight of acrylonitrile. Therefore, it would have been obvious to one skilled in the art at the time invention was made to add styrene-acrylonitrile copolymers to the molding composition containing core-shell polymers of Hofmann in view of Takarabe et al and DeWitt, and obtain a mold with reduced shrinkage and improved surface hardness.

6. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Owens (US 3, 793, 402) in view of Takarabe et al (US 4, 914, 142) and DeWitt et al (US 4, 173, 596) as applied to claim 29 above, and further in view of Falk et al (US 4, 542, 179).

The discussion with respect to Owens in view of Takarabe et al and DeWitt in paragraph 4 above is incorporated here by reference.

Owens in view of Takarabe et al and DeWitt is silent with respect to the use of styrene-acrylonitrile in the molding composition.

However, Falk et al teach that addition of styrene-acrylonitrile copolymer to acrylic core-shell polymers reduces mold shrinkage and improves surface hardness. The styrene-acrylonitrile copolymer resins useful in the practice of this invention are copolymers of styrene and acrylonitrile comprising from 50 to 90% by weight of styrene and 10 to 50% by weight of acrylonitrile. Therefore, it would have been obvious to one skilled in the art at the time invention was made to add styrene-acrylonitrile copolymers to the molding composition containing core-shell polymers of Owens in view of Takarabe et al and DeWitt, and obtain a mold with reduced shrinkage and improved surface hardness.

7. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann (US 4, 180, 529) in view of Takarabe et al (US 4, 914, 142) and DeWitt (US 4, 173, 596) as applied to claim 30 above, and further in view of Shah et al (US 5, 777, 034).

The discussion with respect to Hofmann in view of Takarabe et al and DeWitt in paragraph 3 above is incorporated here by reference.

Hofmann in view of Takarabe et al and DeWitt is silent with respect to the molding composition comprising 0.1 to 10.0% by weight of another polymer with a molecular weight higher by at least 10% than that of (meth)acrylic polymer.

However, Shah et al teach a methacrylate resin blend composition having improved solvent craze resistance. The improvement is achieved in a simple way while retaining the blend composition's desirable properties such as weather resistance, molding, impact resistance and mechanical properties (column 1, lines 1-10). The blend composition contains a methacrylate matrix resin, particles of a single layer polymer and optionally an acrylic multi-layer polymer. The particles of a single layer polymer have a weight average molecular weight of at least 120% of the M_w of the methacrylate matrix resin component (abstract). The simple incorporation of SLP's (single layer polymer) into the methacrylate matrix resin provides the improvement in craze resistance (column 4, line 67; column 5, lines 1-3). The matrix resin will comprise 50 to 90 wt%, the impact modifier resin from 0 to 50 wt% and the single layer polymer from 1 to 50 wt% of the blend composition (column 6, lines 42-45). Therefore, it would have been obvious to one skilled in the art at the time invention was made to add a polymer having a molecular weight of at least 120% of the M_w of methacrylate resin of Hofmann in view of Takarabe et al and DeWitt, in an amount of from 1 to 50 wt% and obtain a molding composition that will exhibit improved solvent craze resistance.

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Owens (US 3, 793, 402) in view of Takarabe et al (US 4, 914, 142) and DeWitt (US 4,

173, 596) as applied to claim 30 above, and further in view of Shah et al (US 5, 777, 034).

The discussion with respect to Owens in view of Takarbe et al and DeWitt in paragraph 4 above is incorporated here by reference.

Owens in view of Takarbe et al and DeWitt is silent with respect to the molding composition comprising 0.1 to 10.0% by weight of another polymer with a molecular weight higher by at least 10% than that of (meth)acrylic polymer.

However, Shah et al teach a methacrylate resin blend composition having improved solvent craze resistance. The improvement is achieved in a simple way while retaining the blend composition's desirable properties such as weather resistance, molding, impact resistance and mechanical properties (column 1, lines 1-10). The blend composition contains a methacrylate matrix resin, particles of a single layer polymer and optionally an acrylic multi-layer polymer. The particles of a single layer polymer have a weight average molecular weight of at least 120% of the M_w of the methacrylate matrix resin component (abstract). The simple incorporation of SLP's (single layer polymer) into the methacrylate matrix resin provides the improvement in craze resistance (column 4, line 67; column 5, lines 1-3). The matrix resin will comprise 50 to 90 wt%, the impact modifier resin from 0 to 50 wt% and the single layer polymer from 1 to 50 wt% of the blend composition (column 6, lines 42-45). Therefore, it would have been obvious to one skilled in the art at the time invention was made to add a polymer having a molecular weight of at least 120% of the M_w of methacrylate resin of

Owens in view of Takarabe et al and DeWitt, in an amount of from 1 to 50 wt% and obtain a molding composition that will exhibit improved solvent craze resistance.

Response to Arguments

9. Applicant's arguments, see page 7, lines 5-9, filed 2/26/2008, with respect to objection of claims have been fully considered and are persuasive. The objection of claims 4-17 has been withdrawn in view of their cancellation.
10. Applicant's arguments filed 2/26/2008 have been fully considered but they are not persuasive. Specifically, applicant argues that (A) in contrast to Owens, in present invention after the core is formed, a first shell is formed from a second composition that is comprised of 80.0 to 100.0 parts by weight of (meth)acrylates and a crosslinking monomer; (B) Owens does not show or suggest the addition of aqueous monomer emulsions for polymerization, wherein the first stage of polymerization occurs in a seed latex; (C) in contrast to Hofmann '529, in present invention the first stage of monomer material which forms the core, is added to a polymer seed latex, wherein the polymer seed particles are of the states particular size range; (D) the seed particles of Takarabe et al are relatively large in contrast to the present seed which has a particle size of 3.0 to 20.0 nm; and (E) DeWitt describes polymer seed particles which have a particle size ranging

from 200 to about 2000 Å (20 to 200 nm) and does not suggest the seed latex particle size radius of the present claims of 3 to 20 nm.

With respect to (A), attention is drawn to example 1 of Owens (lines 44-47), where in the amount of monomers used in each step is mentioned. In 2nd stage, 50 parts of BA (butyl acrylate), 0.1 parts of BDA (butylene glycol diacrylate and reads on crosslinker) and 0.4 parts of DALM (diallyl maleate) are added i.e. the parts by weight of acrylate monomer and crosslinker in the total monomer mixture of 2nd stage is 99 and 0.2 respectively. Thus, it is apparent that parts by weight of monomers in second stage are similar to that of the present claims.

With respect to (B), (C) and (D), these arguments are moot in view of the new ground(s) of rejection necessitated by amendments to present claims.

With respect to (E), as applicant pointed out the average particle size of seed latex in DeWitt et al is 20 nm to 200 nm. It is the examiner's position that the seed latex particle size of 20 nm overlaps with range of seed latex particle radius of 3 to 20 nm disclosed in present claims. It is also noted that present claims are directed to the radius of seed latex while that of DeWitt is to a particle size i.e. diameter. Thus the actual seed latex radius in DeWitt is 10 nm to 100 nm and overlaps substantially with the seed latex radius of present claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARUNA P. REDDY whose telephone number is (571)272-6566.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119.

Art Unit: 1796

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Karuna P Reddy/
Examiner, Art Unit 1796

/David Wu/
Supervisory Patent Examiner, Art Unit 1796